

3146  
p.3

# FIELDIANA · ZOOLOGY

*Published by*

CHICAGO NATURAL HISTORY MUSEUM

Volume 31

JULY 6, 1951

No. 46

## REMARKS ON AND DESCRIPTIONS OF SOUTH AMERICAN NON-MARINE SHELLS

FRITZ HAAS

CURATOR, DIVISION OF LOWER INVERTEBRATES

The material here dealt with was received at various times and from various sources. Dr. Wolfgang Weyrauch of the staff of the Museo Javier Prado, in Lima, Peru, not only placed at my disposition most of the shells gathered by himself on his collecting trips through Peru, but also allowed me to study the collection of Peruvian shells of his Museum. Another important lot was sent to me by Mr. Walter J. Eyerdam, of Seattle, Washington; it contained shells collected by him in the little known, but highly interesting Río Pilcomayo region. Mr. R. Wright Barker, of Maracaibo, Venezuela, favored me with gastropods and bivalves from the interior of that country. Finally, a number of new or critical shells were contained in the Walter F. Webb Collection of non-marine shells acquired by Chicago Natural History Museum some years ago.

The study of so heterogeneous a lot of shells, with only their source in South America in common, can result in nothing more than short faunistic lists, critical remarks on imperfectly known species, and descriptions of novelties, loosely following each other without pretension of logical connection. It is hoped that even so they may further our knowledge of South American land and fresh-water mollusks.

### LAND AND FRESH-WATER MOLLUSKS FROM NORTHWESTERN VENEZUELA AND NEIGHBORING PARTS OF COLOMBIA

Mr. Barker has sent us, at various times, non-marine Venezuelan shells that have a certain zoogeographical interest, though there is only one novelty among them. Most of the material received comes from the State of Zulia, one lot comes from the State of Lara and another from the Department of Atlántico of Colombia, west

No. 669

503

THE LIBRARY OF THE

JUL 20 1951

UNIVERSITY OF ILLINOIS

of Zulia. The majority of the shells presented were ampullarias, and their classification cannot be final. The taxonomy of the ampullariids is still in a confused condition, despite Kobelt's monograph (1911-15), the studies by Alderson (1925), or the recent publication by Pain (1946). It is evident that many of the described "species" are merely environmental phases, not even subspecies, of a comparatively restricted number of basic species. In this unsettled state of affairs, I can do no better than attribute the Venezuelan ampullariids at hand to the respective forms described and figured by either Kobelt or Alderson, with no claim as to the correctness of the resulting list of species.

The species received and the localities where they were collected are as follows:

- Dryptus pardalis* Férussac. Between San Antonio and San Cristobal, Los Andes, Venezuela.
- Oxystyla maracaibensis* Pfeiffer, and the subsp. *imitator* Pilsbry. East of Machango, Zulia, Venezuela.
- Bulimulus (Bulimulus) erectus* Reeve. Toas Island, Zulia, Venezuela.
- Subulina (Subulina) octona trochlea* Pfeiffer. East of Machango, Zulia, Venezuela.
- Systrophia (Systrophieilla) viridis* H. B. Baker. Same locality.
- Streptaxis (Streptartemon) glaber* Pfeiffer. Same locality.
- Ampullarius (Ampullarius) guayanensis* Lamarck, in the sense of Alderson. Santa Rosa River, the Palmar River, and Lake Tule, all in Zulia, Venezuela.
- Ampullarius (Ampullarius) pulcher* Gray, in the sense of Kobelt. Cachiri, Palmar River; junction of Caño Manuelote and the Socuy River, Zulia; near Barquesimeto, Lara, Venezuela.
- Ampullarius (Ampullarius) erroneus* Nevill, in the sense of Kobelt. East of Machango; Quebrada Dibujo, both in Zulia, Venezuela.
- Ampullarius (Ampullarius) semitectus* Mousson. Río Chiquito, Quebrada Lambadero, Zulia, Venezuela. First report of this Colombian species from Venezuela.
- Ampullarius (Ampullarius) superbus* Marshall. Department of Atlántico, Colombia; corresponds perfectly to the original description.
- Ampullarius (Limnopomus) interruptus* Sowerby. Cogollo River, District of Perijá, Zulia, Venezuela.
- Annularia* (subgenus?) *barkeri* sp. nov. From a limestone cave in the Sierra Cachiri, northwest of Maracaibo, Venezuela. (The description follows at the end of this list.)
- Polymesoda (Polymesoda) arctata* Deshayes. Toas Island, Venezuela, and from Palmarejo, north of Maracaibo, Venezuela.
- Anodontites (Anodontites) carinatus carinatus* Dunker. Near El Consejo, District of Bolivar, Zulia, and from the Santa Rosa River near Perijá, Zulia, Venezuela. First record of this species, known before only from the Magdalena River system, from Venezuela.

**Annularia barkeri** sp. nov. Figure 97.

*Type*.—Chicago Natural History Museum No. 30904, from a limestone cave in the Sierra Cachiri, northwest of Maracaibo, District of Mara, State of Zulia, Venezuela. Collected and presented by R. Wright Barker.

*Diagnosis*.—A species of the genus *Annularia*, characterized by lack of puncture, slit or siphon, restriction of spiral sculpture to the umbilical wall, and the turret shape of the shell.

*Comparisons*.—Among the numerous species of *Annularia*, some show combinations of two out of the three above-mentioned charac-



FIG. 97. *Annularia barkeri* sp. nov. C.N.H.M. No. 30904, type, front view; about  $\times 25$ .

teristic features of *barkeri*, but none unite all three. In the classification of annulariids constructed by Henderson and Bartsch (1920), no such combination was marked, and no subgeneric name is available for it. In accordance with the criteria there set up, a new subgenus would have to be created for our novelty. I do not consider these criteria sufficient bases for the creation of a new subgeneric category.

*Description of type*.—Shell turreted, rather solid, densely ribbed; waxy, with traces of bands; narrowly umbilicate; apex decollate, the five remaining whorls gradually increasing in convexity, densely ribbed; the ribs about half as wide as the spaces between them on the earlier whorls, and as wide as these spaces on the last whorl; suture distinct, crenulated; aperture oval, somewhat pointed above, peristome continuous, double, the outer reflexed, especially on the columella, where it is slightly wavy, covering the umbilicus almost completely. A few delicate spiral lines on the umbilical wall. Faint brown spiral bands encircle the whorls, two on the upper ones and five on the last whorl; the first remaining whorl is purple on its upper

half and a purplish streak appears at the middle of the last whorl; operculum typically annularid.

*Measurements of type.*—Height 15.6 mm., width 8.0 mm., height of aperture 4.9 mm., width of aperture 3.9 mm.

*Paratypes.*—Five paratypes, No. 30905, with the same data as the type. Among them is an immature not yet decollated specimen that shows a smooth, waxy, depressed semiglobular apex; the number of whorls is  $6\frac{1}{2}$  and since it lacks about  $1\frac{1}{2}$  whorls for completion of the growth, the entire number of the whorls has to be about eight. Some of the adult or practically adult paratypes are entirely waxy-white, without any purple whorls or streaks, and the spiral bands are either seen in traces or are completely lacking.

*Discussion.*—To the best of my knowledge, this is the first report of an *Annularia* from the South American mainland. I am happy to be able to name such an important addition to our knowledge for its collector, Mr. R. Wright Barker of Maracaibo, an ardent student of molluscan life.

#### ON SOME BULIMULIDS FROM THE PILCOMAYO REGION, BOLIVIA

Preston (1907) described from the region of the Río Pilcomayo, Bolivia, two species of bulimulids that he attributed to the genus *Drymaeus*, namely *D. chacoensis* (op. cit., p. 491, fig. 5), and *D. nigroumbilicatus* (op. cit., p. 491, fig. 6). Chicago Natural History Museum recently received from Mr. Walter J. Eyerdam specimens of these two species and both prove to belong to the subgenus *Peronaeus* of *Bulimulus*. *Bulimulus (Peronaeus) nigroumbilicatus* is represented from two localities in the Bolivian Chaco, and from south of San Pedro de Jujuy, Province of Jujuy, Argentina. This is the first record of the species from outside of Bolivia. The material at hand of *Bulimulus (Peronaeus) chacoensis* proves that *Bulimulus prosopidis* Holmberg, 1912, also from the Río Pilcomayo region, is indistinguishable from *chacoensis*. Another species from that region described by Holmberg (1909) is *Bulimulus viatorum*. A specimen of what I believe to be this species was also received from Mr. Eyerdam, who collected it at Palos Blancos near the Pilcomayo River, in November, 1938; the study of its apical sculpture has revealed that *viatorum* is also a species of the subgenus *Peronaeus*.

#### ON SOME EUROPEAN SLUGS INTRODUCED INTO SOUTH AMERICA

*Milax (Milax) gagates* Draparnaud has been collected by Dr. W. Weyrauch in Tarata near Tacna, on the border between Peru

and Chile, at 3,100 meters altitude, and in Moho on Lake Titicaca, Peru, at 3,900 meters altitude. I do not know whether this species had been reported from these regions before. The Percy Sladen Trust Expedition to Lake Titicaca, in 1937, did not report it from the Titicaca region; however, *M. gagates* has been reported from "Brazil" (J. W. Taylor, 1904).

*Deroceras reticulatum* Müller, reported by Crawford (1939), has been received from Yura, Department of Arequipa, Peru (collected by Karl P. Schmidt, August 8, 1939), and from two other localities where Dr. Weyrauch found it, namely, from Tarata near Tacna, and from Lima.

*Deroceras laeve andecola* Orbigny is the only European slug that has apparently evolved a new race under the new environmental conditions in the Andes. It is already known from Peru from numerous localities, to which I add Moho on Lake Titicaca. The species is represented in Chicago Natural History Museum from Tarata near Tacna (altitude 3,100 meters), on the border between Peru and Chile.

#### REMARKS ON SOUTH AMERICAN NON-MARINE SHELLS

##### **Bulimulus (Protoglyptus) vestalis** Albers. Figure 98.

Described in the *Malakozologische Blätter*, 1: 248, 1854, but not figured, this species seems to have escaped later collectors, for the few publications that mention it refer to the original description and locality. Pilsbry, when preparing his monograph of the Bulimulidae in the *Manual of Conchology*, apparently had no specimens of *vestalis* before him; he refers this species (1898, 11: 290) to the genus *Drymaeus*, though the original diagnosis does not mention the sculpture of the apical whorls. In the Walter F. Webb Collection, which is now being incorporated into the shell collection of Chicago Natural History Museum, I found two specimens labelled *B. vestalis* (No. 31424); they were received from the Zoological Museum in Berlin and their original label states that they had belonged to the J. C. Albers Collection and that they had been collected by Warczewicz in the valley of the Marañon in "Colombia." These data accord with those given by Albers himself in his original description of *vestalis* and the shells themselves correspond so well with the description that I believe them to be paratypes.

The smaller specimen is obviously still immature, whereas the larger one displays the characters of maturity. Its measurements

are: height 19.0 mm., width 9.0 mm., height of aperture 8.5 mm. Albers' type specimen measured 21.0 mm. in height and 9.5 mm. in width.

From the sculpture of the apex, as seen in our figure 98, it becomes evident that *vestalis* is not a *Drymaeus*, but a *Bulimulus* of the type subgenus *Protoglyptus*. The type locality nowadays is situated in

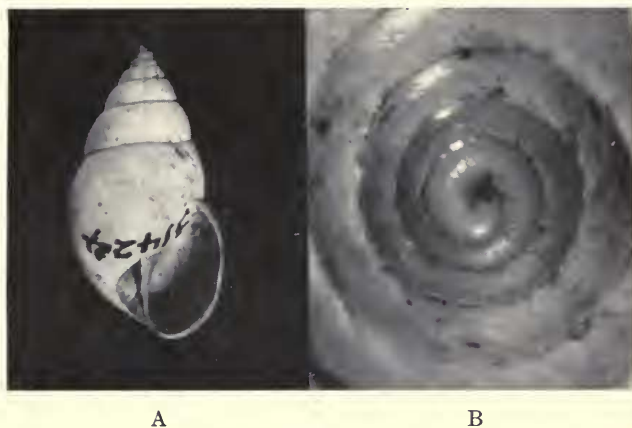


FIG. 98. *Bulimulus (Protoglyptus) vestalis* Albers. C.N.H.M. No. 31424, paratype. A, Front view; about  $\times 2$ . B, Apex from above; about  $\times 30$ .

Peru, but Colombia once possessed and even today claims part of the territory on the north bank of the River Marañon.

### *Bulimulus* (?*Protoglyptus*) *virgultorum* Morelet

*Bulimus virgultorum* Morelet, 1863, Sér. Conch., 3: 194, pl. 10, fig. 1; L. Pfeiffer, 1868, Monogr. Helic. Viv., 6: 134.

*Bulimulus (Mesembrinus) virgultorum* Clessin, 1881, Nomencl. Helic. Viv., p. 244.

*Bulimulus (Lissoacme) virgultorum* Pilsbry, 1896, Man. Conch., (2), 10: 168, pl. 49, figs. 15-22.

*Drymaeus virgultorum* Pilsbry, 1902, Man. Conch., (2), 14: 294; 1902, Man. Conch., (2), Index, 10-14, Classif. Bulimulidae, p. xiv.

The list of synonyms and my own heading show that Morelet's *Bulimus virgultorum* has been referred to under a wide variety of names within the bulimulids. When I began to study the comparatively rich material of *virgultorum* in Chicago Natural History Museum, I first agreed with Pilsbry's original decision to allocate it to the subgenus *Lissoacme* of *Bulimulus*, and I was unable to

find supporting reasons for his later change of mind, according to which *virgultorum* is really a *Drymaeus*, for I had not seen a specimen with the apical sculpture characteristic of this genus. It was not until very recently that new material of *virgultorum* was received from Peru, from Dr. Weyrauch personally, and, through his efforts, from the Museo Javier Prado in Lima. While studying this, I was surprised to find specimens with a definite apical sculpture, which at once removed this species from *Lissoacme*, but which, on the other hand, is very different from the evenly cancellate type seen in *Drymaeus*. In fact, the sculpture observed consists only of thin, low, straight vertical riblets separated by interstices about five or six times wider and very minutely granular; in other words, its characters are those of the subgenus *Protoglyptus*.

Most of the species of *Protoglyptus* are restricted to the eastern part of South America, from the Caribbean islands to northwestern Argentina, and only a few are thus far known from the Andean region. These are *weeksii* Pilsbry, 1930, *tubulaxis* Pilsbry, 1930, and *subcostatus* Haas, 1948. These Andean *Protoglyptus*, however, look very different from *virgultorum*. I am, accordingly, by no means sure that this last-named species really belongs to *Protoglyptus*. I place it with this subgenus only tentatively and as a challenge for further investigations.

The material at hand of *Bulimulus* (?*Protoglyptus*) *virgultorum* Morelet consists of the following series:

- A. Valle de Santa Ana, near Cuzco, Peru. Collected by Karl P. Schmidt, 1939. Four fresh specimens, all with smooth apices.
- B. Sucre, near Cuzco, Peru. Museo Javier Prado, Lima, Peru. Four somewhat worn shells, three with smooth apices and one with costulate apex.
- C. Huanta, Peru, 3,100 meters altitude. Collected by Dr. W. Weyrauch. Two fresh specimens, one with smooth and one with costulate apex.
- D. Huaqueña, Peru, Valle Urubamba, 1,300 meters altitude. Collected by Dr. W. Weyrauch. Thirteen fresh specimens, nine devoid of and four with apical sculpture.
- E. Anco, Peru, Río Mantaro, 2,500 meters altitude. Collected by Dr. W. Weyrauch. Eleven fresh specimens, five without and six with apical sculpture.
- F. Mejorada, Peru, Río Mantaro, 2,900 meters altitude. Collected by Dr. W. Weyrauch. Twenty-one fresh specimens, all with costulate apices.
- G. "Peru." Museo Javier Prado, Lima, Peru. Six bleached and worn specimens, all with sculptured apices.
- H. "Peru." Museo Javier Prado, Lima, Peru. Six bleached specimens, all with sculptured apices.
- I. "Peru." Museo Javier Prado, Lima, Peru. Seven bleached and worn specimens, all with sculptured apices.

The state of preservation of these 74 shells, as seen from the preceding list, varies greatly, some showing the apical parts fresh and intact, some having them partly worn off, and others, finally, presenting them in a state of disintegration, as result of which the superficial calcareous layer of the nepionic shell has entirely disappeared. The presence or the absence of an apical sculpture is very much, but not entirely, in agreement with the conditions described. Thus a definite sculpture of riblets whose upper ends may even crenulate the suture, is mostly seen in the well-preserved specimens, whereas those whose apices are partly worn off showed only traces of this costulation; in the entirely disintegrated apices, of course, no traces of a former costulation are left.

There are, however, a few cases in which the apices of fresh, well-preserved shells are without any trace of an apical sculpture, while other specimens from the same lot and of equally excellent preservation showed in some cases a definite apical sculpture of vertical riblets.

### ***Bulimulus (Peronaeus) pupiformis* Broderip**

Two specimens of this species from the type locality, Huasco, Chile, were received from the Museo Javier Prado in Lima. Whereas the apex of one of these shells shows smooth apical whorls under the microscope, the other presents a faint and densely set spiral striation on the first two whorls, comparable with that of the subgenus *Scansicohlea* Pilsbry. If further research proves that the spiral striation on the apex of *pupiformis* is the primary stage and that the smoothness seen in other specimens of this species is only secondary, being the result of superficial disintegration of the oldest whorls, then the subgeneric name *Peronaeus* Albers, 1850, typified with *P. pupiformis* by E. von Martens, 1860, would become the name applicable for those spirally striated species for which Pilsbry created the name *Scansicohlea* in 1930, and a new subgeneric name would be needed for the smooth species of *Bulimulus*, which are still assembled under the name of *Peronaeus*.

### ***Thaumastus (Quechua) salteri* Sowerby. Figure 99.**

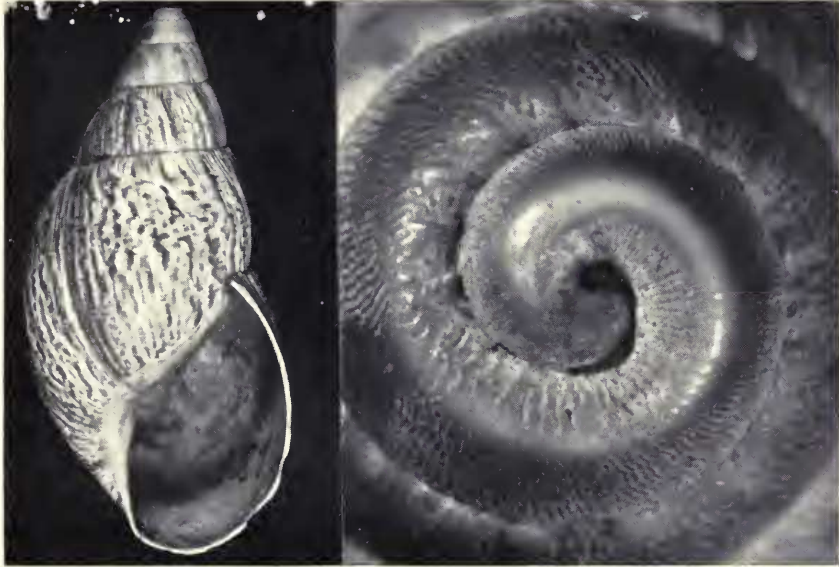
*Thaumastus (Quechua) salteri* has been figured but once (Proc. Zool. Soc. London, 1889, pl. 56, fig. 4), and not very well; in Pilsbry's treatise of the bulimulids in the *Manual of Conchology*, (2), 10, pl. 30, fig. 22, 1895, the original figure of Sowerby was copied. Under these circumstances it seems worthwhile to figure this comparatively rare



species, not only to give a better representation of the shell, but also to demonstrate a certain amount of variation.

**Bulimulus (Lissoacme) reconditus** Reeve

There are some specimens from Acobamba near Tarna, Peru, 3,000-3,200 meters altitude, collected by Weyrauch, which I believe



A

B

FIG. 99. *Thaumastus (Quechua) salteri* Sowerby. C.N.H.M. No. 30760. A, Front view; about  $\times 1$ . B, Apex from above; about  $\times 9$ .

to belong to this rare species. Originally described from an unknown locality, *reconditus* or a closely related variety of it was later cited by Pfeiffer from "Peru," and my specimens seem to be the first known from an exact locality. Some of the shells at hand closely resemble Reeve's figure (the only existing one), but a larger number show less chestnut streaking, being almost entirely and uniformly whitish; all of them, however, agree perfectly in the shape of the shell.

**Plurodonte (Isomeria) meobambensis** Pfeiffer

A specimen of *Isomeria* received from the Museo Javier Prado in Lima, Peru, without a specific locality and only with the general information "Peru" seems to correspond to the descriptions of both

*I. meobambensis* Pfeiffer, 1856, and of *I. equestrata* Morelet, 1858. Since both of these species were described from Moyobamba, I see no reason why *equestrata* should not be considered a synonym of the older name *meobambensis*.

### **Obeliscus (Ischnocion) triptyx** Pilsbry

A single specimen of this species, hitherto known only from Colombia, was found by Dr. W. Weyrauch in the Chanchamayo Valley, 800 meters altitude, Peru. Pilsbry (1907) considered his new subgenus *Ischnocion* to belong to *Leptinaria*, but Thiele (1931) made it a subgenus of *Obeliscus*, which in fact it greatly resembles, except for the folds in the aperture; these may have been developed secondarily in this genus, which is otherwise devoid of them.

#### DESCRIPTIONS OF NEW SPECIES OF SOUTH AMERICAN NON-MARINE SHELLS

### **Bulimulus (Protoglyptus) rhabdotus** sp. nov. Figure 100.

*Type*.—Chicago Natural History Museum No. 30915, from Ambo, near Huánuco, Peru. Altitude 2,000 meters. Collected by and received from Dr. W. Weyrauch.

*Diagnosis*.—A slender species of the subgenus *Protoglyptus* of *Bulimulus*, characterized by the shell sculpture of high, heavy, beam-like ribs.

*Comparisons*.—*Bulimulus (Protoglyptus) subcostatus* Haas, the only other typical *Protoglyptus* from Peru, is somewhat similar, but is stouter, shorter, and less heavily though more densely ribbed; no other comparable species is known to me.

*Description of type*.—Shell slender, turritiform, subsolid, creamy white, distinctly ribbed by irregularly spaced, straight, beam-like ribs of the same color or of a grayish-purple, rimate. Whorls  $7\frac{1}{2}$ , the first  $1\frac{1}{2}$  apical ones rather convex, dark purple, minutely vertically ribbed, the remaining ones flatter and white, with heavy, projecting ribs that are separated by interstices from one to two times as wide as the ribs. Aperture elongated, pear-shaped, with straight, simple margins, of which only the basal is shortly reflected over the umbilical chink; inside of aperture of the same color as the shell, the ribs showing as grayish or purple streaks.

*Measurements of type*.—Height 16.4 mm., diameter 5.1 mm., height of aperture 6.3 mm., diameter of aperture 2.7 mm.

*Paratype*.—No. 30916, same data as the type. Having been collected as a dead specimen, the paratype does not show the purplish color of the ribs, the entire shell being chalky white with the exception of the purplish apex. Its dimensions are: height 14.0 mm., diameter 4.8 mm., height of aperture 5.9 mm., width of aperture 2.1 mm.



FIG. 100 (above). *Bulimulus* (*Protoglyptus*) *rhabdotus* sp. nov. C.N.H.M. No. 30915, type, front view; about  $\times 3$ .



FIG. 101 (right). *Bulimulus* (*Peronaeus*) *webbi* sp. nov. C.N.H.M. No. 31335, type, front view; about  $\times 3.5$ .

***Bulimulus* (*Peronaeus*) *webbi* sp. nov. Figure 101.**

*Type*.—Chicago Natural History Museum No. 31335, from Tacana, near Surcubamba, Department of Tayacaya, Peru. Collector not known. From the Walter F. Webb Collection.

*Diagnosis*.—A species of the subgenus *Peronaeus* of *Bulimulus*, characterized by the large number of whorls ( $12\frac{1}{2}$ ), which are regularly and heavily ribbed.

*Comparisons*.—This species is in some respects intermediate between the subgenera *Geoceras* and *Peronaeus* and may prove that they cannot be separated. There seem to be no closer relatives of *webbi*; it shares the costation, a feature uncommon in *Peronaeus*, with *scalaroides* Philippi, which, however, is much shorter and has

fewer whorls. The presence of narrow spiral bands on the creamy-white shell is also unusual.

*Description of type.*—Shell subulate, slightly tapering below, subsolid, narrowly umbilicate, creamy-white, with three maroon, narrow bands on the last whorl, of which the subsutural one is incomplete, while the peripheral is the only one that shows on the earlier whorls; umbilical region maroon. Whorls  $12\frac{1}{2}$ , very gradually increasing, the first three transparent, of a pale flesh color, and smooth, the remaining ones opaque, creamy-white, heavily, regularly and obliquely costulated; the whorls, separated by a somewhat appressed suture, are decidedly convex, the peripheral band making them look carinate. Aperture small, elliptical, margins straight but for the slightly reflexed columellar one; there are traces of a fourth band around the umbilical region.

*Measurements of type.*—Height 15.5 mm., width 4.8 mm., height of aperture 4.1 mm., width of aperture 2.6 mm.

*Remarks.*—The type, the unique specimen of this species, is slightly damaged at its aperture. It has long been in the Webb Collection, marked as a probable new species, and I take pleasure in connecting the name of its former owner with it.

### ***Bulimulus (Peronaeus) virgula* sp. nov. Figure 102.**

*Type.*—Chicago Natural History Museum No. 30917, from Ninabamba on the Pampas River, Peru. Altitude 2,700 meters. Collected by and received from Dr. W. Weyrauch.

*Diagnosis.*—A species of the subgenus *Peronaeus* of *Bulimulus*, characterized by its extreme slenderness.

*Comparisons.*—*B. spiculatus* Morelet is the most closely related species, but it differs from this novelty by being longer (19–24 mm.), stouter (4–5 mm.), and by having only  $10\frac{1}{2}$  whorls, while the shorter new species (17.3 mm.) has a diameter of only 2.1 mm. and has  $11\frac{1}{2}$  whorls.

*Description of type.*—Shell subulate, subsolid, grayish, ribbed, rimate. Whorls  $11\frac{1}{2}$ , the first two smooth and convex, the following ones flat and densely covered with slender ribs slightly narrower than the interstices, slightly oblique and occasionally anastomizing; suture superficial. Aperture low, its height contained about six times in the height of the shell, elongate-pear-shaped, whitish brown within; peristome simple, acute, reflexed only at the columella, and with a callus on the parietal wall almost reaching the upper insertion. Umbilical chink hidden by the columellar reflexion.

*Measurements of type.*—Height 17.3 mm., width 2.1 mm., height of aperture 2.7 mm., width of aperture 1.2 mm.

***Bulimulus (Peronaeus) claviformis* sp. nov.** Figure 103.

*Type.*—Chicago Natural History Museum No. 31212, from



FIG. 102 (above). *Bulimulus (Peronaeus) virgula* sp. nov. C.N.H.M. No. 30917, type, front view; about  $\times 2$ .



FIG. 103 (right). *Bulimulus (Peronaeus) claviformis* sp. nov. C.N.H.M. No. 31212, type, front view; about  $\times 2.5$ .

Abancay, Peru. Collected by a native. Walter F. Webb Collection, now in Chicago Natural History Museum.

*Diagnosis.*—A species of the subgenus *Peronaeus* of *Bulimulus*, characterized by its height (29.0 mm.) and by the great number of whorls (14).

*Comparisons.*—Similar to *Bulimulus (Peronaeus) spiculatus* Morelet in slenderness combined with the reduction of the umbilical hole, but that species is subulate, narrowly rimate, shorter (24.0 mm.), with only  $10\frac{1}{2}$  whorls, whereas the new species is decidedly club-shaped, entirely imperforate, higher (29.0 mm.), and with fourteen whorls.

*Description of type.*—Shell imperforate, club-shaped, subsolid, creamy-white with chestnut-brown, oblique streaks, the apical

whorls purplish. Surface with a faint waxy luster, closely and finely, rather regularly rib-striate. First whorls flat, slowly increasing in convexity, only the last one really convex; suture superficial but clear cut. Whorls fourteen, the last one gently rounded below. Ill-defined white spiral bands are visible on the last two whorls, becoming more distinct on the under side of the last one. Aperture



FIG. 104. *Bulimulus (Scutalus) revinctus altorum* subsp. nov. C.N.H.M. No. 30912, type, front view; about  $\times 3$ .



FIG. 105. *Bulimulus (Scutalus) punctilineatus* sp. nov. C.N.H.M. No. 30914, type, front view; about  $\times 2.5$ .

small, contained about four times in the height of the shell; all lips acute, only the columellar one reflexed; columella of medium length, thin, slender, parietal callus thin.

*Measurements of type.*—Height 29.0 mm., width 7.6 mm., height of aperture 7.9 mm., width of aperture 4.4 mm.

*Remarks.*—Only the type is at hand. The lower part of its aperture is slightly damaged, as shown in figure 103.

***Bulimulus (Scutalus) revinctus altorum*** subsp. nov. Figure 104.

*Type.*—Chicago Natural History Museum No. 30912, from the Puna between Andahuaylas and Abancay, Peru. Altitude 4,000 meters. Collected by and received from Dr. W. Weyrauch.

*Diagnosis.*—A subspecies of *Bulimulus (Scutalus) revinctus* Hupé characterized by its small size.

*Comparisons.*—The nominate race attains the height of 27–29 mm., whereas the number of whorls varies between 5 and  $5\frac{1}{2}$ ; the

new race, identical as to shell characters with *revinctus* proper, though with almost five whorls, measures only 18.1 mm. in altitude, and shows, nevertheless, the sign of being adult by the character of its aperture. Of the many pattern-phases of *revinctus revinctus*, the new subspecies resembles that with numerous brown bands and a few oblique streaks.

*Description of type.*—Shell ovate obese, subsolid, slightly shiny, wrinkly striate and occasionally obsolete granulated by minute decussating spiral lines, rimate. Whorls  $4\frac{3}{4}$ , moderately convex, suture distinct, irregularly wavy. Aperture large, ovate; margins blunt, except at the reflexed columellar margin.

*Measurements of type.*—Height 18.1 mm., width 11.3 mm., height of aperture 11.1 mm., width of aperture 7.2 mm.

*Paratypes.*—Two paratypes, No. 30913, with the same data as the type. They are typical, but evidently immature and do not afford information concerning the range of variation.

### **Bulimulus (Scutalus) punctilineatus** sp. nov. Figure 105.

*Type.*—Chicago Natural History Museum No. 30914, from Sahuayaco in the Urubamba Valley, Peru. Altitude 800 meters. Collected by and received from Dr. W. Weyrauch.

*Diagnosis.*—A species of the subgenus *Scutalus* of *Bulimulus* characterized by its ornamentation with many narrow, interrupted spiral bands, with a broader one circling the umbilical perforation.

*Comparisons.*—The closer relatives of this new species are to be found in the group of *B. (Scutalus) culmineus* Orbigny, but they are more solid in structure and none of them shows its peculiar punctilineate bands.

*Description of type.*—Shell ovate-conic, somewhat solid, translucent, smooth, ornamented with interrupted, narrow, dark chestnut-brown bands on a yellowish-white background and with a wider, continuous band around the perforation. Whorls  $7\frac{1}{2}$ , rather convex, the apical ones light horn color with the *Scutalus* pattern of sculpture, the remaining ones yellowish-white with four dotted lines, the last with six and the circumumbilical band; under the lens, the seemingly smooth surface shows minute, broken spiral lines crossing the faint growth lines, especially on the last whorl. Aperture oval, with simple peristome, slightly expanded at the columella; the banding of the surface shows within.

*Measurements of type.*—Height 19.1 mm., width 9.6 mm., height of aperture 8.1 mm., width of aperture 5.0 mm.

***Bulimulus (Ataxus) perforatus* sp. nov.** Figure 106.

*Type.*—Chicago Natural History Museum No. 30906, from Ninabamba on the Pampas River, an affluent of the Apurimac River,



A

FIG. 106. *Bulimulus (Ataxus) perforatus* sp. nov. C.N.H.M. No. 30906, type. A, Front view. B, View from below. Both about  $\times 2.5$ .



B

Peru. Altitude 2,000 meters. Collected by and received from Dr. W. Weyrauch.

*Diagnosis.*—A species of the subgenus *Ataxus* of *Bulimulus*, characterized by its comparative stoutness and the width of the umbilicus.

*Comparisons.*—All the described species of *Ataxus* are more slender than this new species and none of them has an equally wide umbilicus. *B. (Ataxus) tubulatus* Morelet of equal length and of similar rib-sculpture is decidedly more slender and has a funnel-shaped umbilicus, while in *perforatus* the umbilicus looks almost like a drill-hole.

*Description of type.*—Shell obesely turreted, translucent, but subsolid, densely and arcuately hair-ribbed, whitish with brownish or purplish streaks, deeply and openly umbilicate. Whorls  $9\frac{1}{2}$ , the apical ones purple, smooth, swollen, the remaining ones whitish, flatter and hair-ribbed; lower side of last whorl occupied by the wide umbilicus, which is contained two and one-half times in the diameter of the shell, and which is bordered by a distinct ridgelike angulation. Aperture high and narrow, biangular, the circum-



umbilical ridge extending to the lower angulation; margins simple, approaching, united by a callus, the basal lip slightly expanded.

*Measurements of type.*—Height 19.5 mm., width 8.2 mm., height of aperture 8.1 mm., width of aperture 4.0 mm., diameter of umbilicus 3.4 mm.

*Paratypes.*—Twenty-nine paratypes, No. 3907, with the same data as the type. The largest specimen has a height of 22.9 mm., and another shell 20.0 mm. high has a diameter of 8.9 mm. The color of the apical whorls varies from purplish to horn-brown to yellowish-white and there is considerable variation in the extent of the brown and purplish streaks, almost white specimens contrasting with others in which the brown color of the streaks almost subdues the basic white coloration.

One paratype, No. 31096, from the Walter F. Webb Collection, from Peru, with no more definite locality. The specimen, with height of 24.0 mm. and diameter 8.2 mm., is higher than the type and the other paratypes, is more cylindric and, with almost twelve whorls, much more densely coiled than these; it shows no brownish streaks on the white basic color of the shell, but is otherwise typical.

### ***Bostryx (Vermetellus) metagyra* Pilsbry and Olsson**

The two lots of this species (Nos. 30918 and 30919) in Chicago Natural History Museum stem from the identical source from which its authors had their specimens, namely, the Museo Javier Prado in Lima, Peru, with the locality given as "Peru."

I received these specimens early in 1949 for classification and, if necessary, for description. Thus it happened that, when I recognized them as the representatives of a new species, I prepared a description, unaware that they had just been described by Pilsbry and Olsson (1949). I fully agree with these authors as far as the specific evaluation of the shell characters is concerned. However, I disagree with them as regards the systematic position of this strange species. Whereas Pilsbry and Olsson consider it a typical *Bostryx*, closely related to *Bostryx (Bostryx) solutus* Troschel, I cannot see such a close relationship between the two species, for both differ widely in their mode of shell growth and their respective shell sculptures. For this reason I feel compelled to create for *metagyra* a new subgenus, which can be characterized in the following way:

**Bostryx (Vermetellus) subgen. nov.** Figure 107.

A small bulimulid shell of almost equal height and width, of irregular growth comparable to that of some vermetid prosobranchi-ates, the first whorls growing regularly in the shape of a pillar, the last one abruptly growing wider, coiled up in a single plane, em-



A



B

FIG. 107. *Bostryx (Vermetellus) metagyra* Pilsbry and Olsson, C.N.H.M. No. 30918. A, Front view. B, Side view. Both about  $\times 3$ .

bracing the penultimate and ascending toward the aperture. Apical whorls smooth, the first four whorls with little sculpture or none, the last one heavily sculptured with vertical ribs and spiral keels.

Type: *Bostryx (Vermetellus) metagyra* Pilsbry and Olsson.

There is a greater variability in the dimensions of this species than becomes evident from the measurements of two specimens as given by Pilsbry and Olsson. Seven specimens in Chicago Natural History Museum show the following measurements:

Height	Width	Height/width
7.9	9.0	0.88
9.1	8.8	0.97
9.2	8.5	0.92
9.7	7.8	0.80
9.1	8.1	0.89
8.1	7.1	0.89
8.7	8.6	0.99
9.2	8.8	0.98

**Drymaeus (Drymaeus) pseudelatus** sp. nov. Figure 108.

*Type*.—Chicago Natural History Museum No. 30908, from Anco on the Mantaro River, Peru. Altitude 2,500 meters. Collected by and received from Dr. W. Weyrauch.

*Diagnosis.*—A species of *Drymaeus* proper, characterized by its considerable slenderness, which exceeds that of any other known species of the genus.

*Comparisons.*—This new species stands quite isolated within its genus, whereas forms of similar appearance are found in the sub-genus *Peronaeus* of *Bulimulus*; *B. (Peronaeus) elatus* Philippi in



FIG. 108. *Drymaeus (Drymaeus) pseudelatus* sp. nov. C.N.H.M. No. 30908, type, front view; about  $\times 3.5$ .

particular has a striking resemblance to *Drymaeus pseudelatus* but for the sculpture of its apical whorls, which, of course, is quite different.

*Description of type.*—Shell slender, almost turreted, subsolid, irregularly striate, a little shining, white with brown streaks, narrowly umbilicate. Whorls  $9\frac{1}{2}$ , a little convex, the apical ones deep purplish and with the typical sculpture of the genus, the following one wine-brown and almost smooth, the remaining ones creamy-white with irregularly spaced brown streaks and beset with oblique, low, rib-like striae wider than the interstices. Aperture small, little oblique, oblong; peristome simple, unexpanded and acute. Only the columellar margin is reflexed and partly conceals the narrow umbilicus, which is encircled by a narrow, chestnut band.

*Measurements of type.*—Height 15.2 mm., width 5.1 mm., height of aperture 5.1 mm., width of aperture 2.9 mm.

*Paratypes.*—Four paratypes, No. 30909, with the same data as the type. In one of these the apex is not deep purplish, but horn color, and two of them show faded, interrupted narrow bands below the periphery of the last whorl. Five paratypes, No. 30910, from Andahuaylas, altitude 3,100 meters, Peru, collected and received from Dr. W. Weyrauch. In this lot, also, the color of the apex varies



A



B



C

FIG. 109. *Drymaeus (Drymaeus) basitorus* sp. nov. C.N.H.M. No. 31354, type. A, Front view. B, Side view. C, View from below. All about  $\times 2.5$ .

from deep purple to horn color and the range of variation of the color pattern is about the same as in the form from Anco.

***Drymaeus (Drymaeus) basitorus* sp. nov.** Figure 109.

*Type*.—Chicago Natural History Museum No. 31354, from Chanchamayo, Peru. Altitude 1,000 meters. Collected by a native. In the Walter F. Webb Collection.

*Diagnosis*.—A species of the *nystianus* group of *Drymaeus* proper, characterized by an extremely thin shell, blunt keel in the umbilical area, high and wide aperture, and color pattern.

*Comparisons.*—Most closely related to *Drymaeus canaliculatus* Pfeiffer from Bolivia, but easily distinguished by the great thinness of the shell, the different shape of the aperture, and the different coloration.

*Description of type.*—Shell extremely fragile, translucent, narrowly umbilicate, obliquely fusiform, dirty yellow with faint, blackish bands or streaks, of a dull waxy appearance. Spire acute, almost conic,  $6\frac{1}{2}$  slightly convex whorls, regularly increasing, the last definitely larger than the spire, suddenly widened before the aperture, pinched into a blunt keel around the umbilical chink. Columella arcuate. Aperture wide, effuse at base; peristome slightly reflexed above, more so below, with a flat depression behind the lower outer margin; columellar margin dilated, reflexed. Four bands of blackish dots are visible on the last whorl; the two upper ones and the two lower ones respectively partly connected by streaks; on the upper whorls, where only the upper couple of bands can be seen, the connecting streaks tend to become zigzag-like.

*Measurements of type.*—Height 30.2 mm., width 14.3 mm., height of aperture 17.7 mm., width of aperture 9.8 mm.

*Remarks.*—The type specimen is slightly damaged on the parietal wall of the aperture and the adjoining portion of the last whorl.

*Paratype.*—One specimen, No. 31355, same provenience as the type, is slightly smaller than the type (height 25.5 mm.), and its apertural region is partly damaged; in all other respects, this paratype corresponds perfectly with the type.

### **Thaumastus (Quechua) tetricus** sp. nov. Figure 110.

*Type.*—Chicago Natural History Museum No. 30920, from Huacapistana on Río Tarma, Junín Province, Peru. Received from the Museo Javier Prado in Lima, Peru.

*Diagnosis.*—A species of the subgenus *Quechua* of *Thaumastus*, characterized by the dull, somber coloration without any obvious color bands, and by its small size, which distinguishes it from similarly colored congeners.

*Comparisons.*—The only species comparable with this novelty is *Thaumastus cadwaladeri* Pilsbry from the same locality, which differs however from *tetricus* in being considerably larger (70.2 mm. against 52.6 mm.) and of oblong-conic shape, whereas *tetricus* is more slender and turritiform.

*Description of type.*—Shell perforate, oblong-turreted, rather solid, composed of  $7\frac{1}{2}$  whorls, which are rather flat, slightly more

convex in the last two, and separated by a distinct, but not very deep suture; apical whorls with the typical sculpture and of the typical formation of the subgenus *Quechua*. Color of a dull brownish green, lighter green toward the sutures, with occasional traces of lighter bands. There are distantly placed vertical folds, which grow



FIG. 110. *Thaumastus (Quechua) tetricus* sp. nov. C.N.H.M. No. 30920, type. A, Front view. B, Side view. Both about  $\times 1.25$ .

stronger near the upper suture and which make this appear crenulate. The aperture is small, ovate, dark flesh-colored within. All the margins are slightly thickened but hardly reflexed, except the columellar one. The purple enamel of the columella expands as a thin pad over the parietal wall.

*Measurements of type.*—Height 52.6 mm., width 20.6 mm., height of aperture 20.1 mm., width of aperture 10.8 mm.

*Remarks.*—Only a single specimen, the type, is at hand.

**Epiphragmophora (Epiphragmophora) leucobasis** sp. nov.  
Figure 111.

*Type.*—Chicago Natural History Museum No. 30923, from above Chincheros, near Río Pampas, Peru. Altitude 3,000 meters. Collected by and received from Dr. W. Weyrauch.

*Diagnosis*.—A medium-sized species of *Epiphragmophora* proper, characterized by a broad infra-peripheral band, and by the fact that the remainder of the lower side is white.

*Comparisons*.—All the comparable species lack the wide infra-peripheral band and the light coloration of the circumumbilical region.

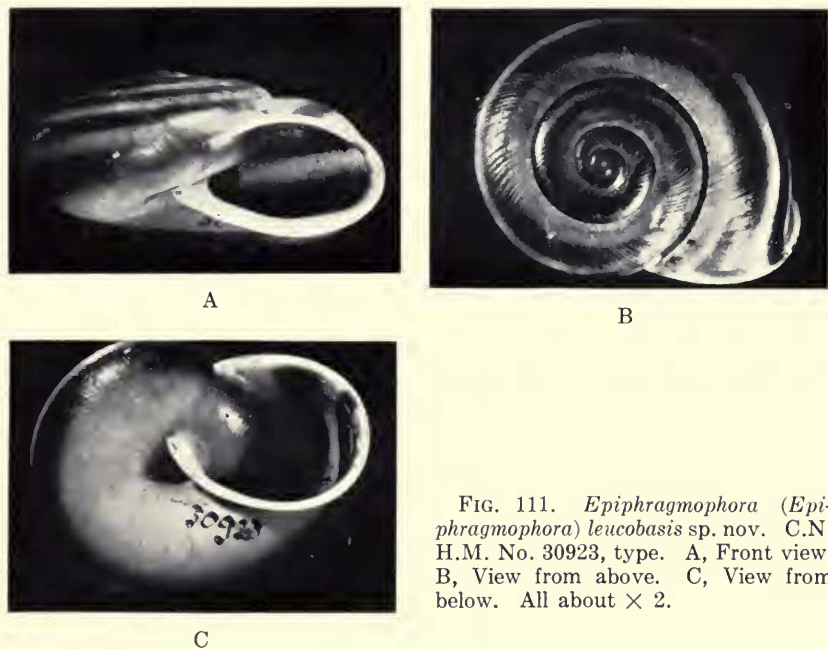


FIG. 111. *Epiphragmophora* (*Epiphragmophora*) *leucobasis* sp. nov. C.N. H.M. No. 30923, type. A, Front view. B, View from above. C, View from below. All about  $\times 2$ .

*Description of type*.—Shell depressed conical, narrowly umbilicate, rather thin, shiny, with three chestnut-brown bands (one supra-peripheral, one peripheral and one infra-peripheral). Whorls four, rather convex, separated by a superficial suture, the last descending below the periphery at the aperture. The first whorl appears smooth, the following ones are sculptured by many rib-like, regular growth-striae, which, on the last whorl, are crossed by many irregular, wavy spiral lines producing a decussate-malleate appearance. The basic color of the shell is a light brown; the three bands, of which the peripheral is the narrowest, the upper one about  $1\frac{1}{2}$  times and the lower one about three times as wide, are of chestnut color, rather distinctly defined but for the lower edge of the infra-peripheral band, which gradually fades into the creamy-white of the rather convex circumumbilical region. The aperture is almost exactly ovate, little excised by the preceding whorl, rather broadly lipped, with

approaching ends; parietal callus very weak, reflexion of the basal lip covering about one-fourth of the umbilicus.

*Measurements of type*.—Diameter 27.3 mm., height 14.8 mm., width of aperture 12.9 mm., height of aperture 10.7 mm., diameter of umbilicus 3.1 mm.

**Epiphragmophora (Epiphragmophora) hemiomphalos** sp. nov.  
Figure 112.

*Type*.—Chicago Natural History Museum No. 30902. Received from the Museo Javier Prado in Lima with the locality "Peru."

*Diagnosis*.—One of the smaller species of *Epiphragmophora* proper, characterized by the half-closed umbilicus, the white basic color of the shell, and a tooth-like lamella on the outer lip on its insertion.

*Comparisons*.—There is no particular species to which this new form can properly be compared. As to color, it is as clear as *E. pellis-colubri* Philippi, and even whiter, and it also has a single chestnut band. It is much smaller in size and has about the same diameter as *E. urubambensis* Pilsbry. The umbilicus, half-covered by the reflexion of the basal lip, seems to be unique in *Epiphragmophora*, as is the strange tooth-like projection on the outer lip at its insertion.

*Description of type*.—Shell umbilicate, thin but solid, much depressed, with subangulate periphery, which becomes rounded in the latter half of the last whorl. Whorls four, little convex, the last twice as wide as the preceding. Surface glossy, buff-white on the three first, pure white on the last whorl, with one narrow peripheral chestnut-brown band; last whorl minutely descending toward the aperture. The first whorl smooth, the following ones marked with growth-striae, the interstices microscopically granular; the last whorl shows, in addition, unequal and slightly wavy, microscopical spiral lines, interrupted at the growth-striae. Aperture oval save for the segment excised by the penultimate whorl, peristome narrowly reflexed all around, dilated a little at the columellar insertion and covering about one-half of the narrow umbilicus. The upper insertion of the outer lip is remarkable for a tooth-like projection of the lower half of the upper lip, which appears almost double; a callus, distinct above and below, very thin in the center, connects the two extremes of the peristome.

*Measurements of type*.—Diameter 21.8 mm., height 10.0 mm., width of aperture 10.0 mm., height of aperture 8.4 mm., diameter of umbilicus 2.8 mm.



*Paratype*.—No. 30903, with the same data as the type. A specimen collected dead, bleached, somewhat more solid than the type and of almost identical dimensions.

*Remarks*.—Had it not been for two distinctive features, unfamiliar among the species of *Epiphragmophora* and present in both specimens at hand, i.e., the half-covered umbilicus and the tooth-like projection



A



B



C

FIG. 112. *Epiphragmophora* (*Epiphragmophora*) *hemiomphalos* sp. nov. C.N.H.M. No. 30902, type. A, Front view. B, View from above. C, View from below. All about  $\times 2.5$ .

on the insertion of the outer lip, I should not have ventured to describe a new species without exact locality.

***Solaropsis* (*Psadara*) *inornata* sp. nov.** Figure 113.

*Type*.—Chicago Natural History Museum No. 30929, from the Río Chusgon, affluent of the Río Marañon, at Hacienda Santa Elena, Peru. Altitude 1,600-2,150 meters. Collected by Dr. W. Weyrauch and presented by the Museo Javier Prado of Lima, Peru.

*Diagnosis*.—A species of the subgenus *Psadara* of *Solaropsis*, characterized by its brownish color, without any trace of the familiar pattern of *Solaropsis*-decoration.

*Comparisons*.—Similar in shape and size to *S. rosarium* Pfeiffer, or to the related *S. kühni* Pfeiffer, but with a much wider umbilicus and without any color design.

*Description of type.*—Shell depressed, almost planorboid, thin, translucent, light corneous brown, shining, with a wide, funnel-shaped umbilicus. Whorls  $4\frac{1}{2}$ , regularly increasing, convex; suture deep, almost channelled; all whorls superficially ornamented by closely set, hair-like, slightly undulated and occasionally anastomosing striae. Aperture almost circular, slightly excised by the penultimate whorl,



A



B



C

FIG. 113. *Solaropsis (Psadara) inornata* sp. nov. C.N.H.M. No. 30929, type. A, Front view. B, View from above. C, View from below. All about  $\times 2.5$ .

slightly oblique; peristome straight, not expanded, its ends converging. Umbilicus almost one-third of the greater diameter of the shell, funnel-shaped, deep.

*Measurements of type.*—Height 7.8 mm., width 14.3 mm., width of aperture 6.2 mm., height of aperture 6.0 mm., diameter of umbilicus 3.8 mm.

*Paratypes.*—Chicago Natural History Museum No. 30930. The diameter of a well-preserved, but bleached specimen is 16.0 mm. The height of the spire in the series of seven varies from slightly raised to perfectly flat; the apex may be raised above the level of the last whorl, while the intermediate whorls are slightly sunk beneath it.

*Solaropsis (Psadara) monile peruviana* subsp. nov. Figure 114.

*Type.*—Chicago Natural History Museum No. 30928, from

Sahuayaco, Urubamba Valley, Peru. Altitude 800 meters. Collected by and received from Dr. W. Weyrauch.

*Diagnosis.*—A subspecies of *Solaropsis monile* Broderip, characterized by smaller size and by the narrower umbilicus.

*Comparisons.*—This new Peruvian subspecies is closely related to the Colombian *Solaropsis (Psadara) monile* Broderip, but is smaller,

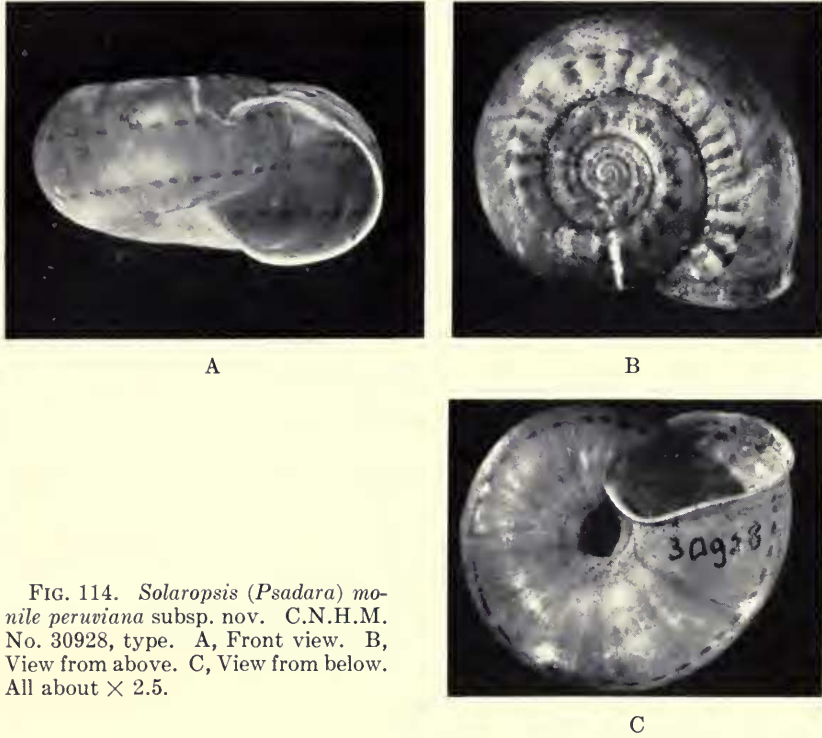


FIG. 114. *Solaropsis (Psadara) monile peruviana* subsp. nov. C.N.H.M. No. 30928, type. A, Front view. B, View from above. C, View from below. All about  $\times 2.5$ .

despite the equal number of whorls, and its umbilicus is narrower, measuring only about one-sixth of the shell diameter, whereas in typical *monile* the umbilicus measures about one-third of the shell diameter; lastly, the peristome of the Peruvian novelty is thinner and narrower than the peristome of the Colombian nominate form.

*Description of type.*—Shell discoidal with slightly sunk spire, thin, translucent, pale corneous; minutely granular, moderately umbilicate, ornamented with a series of angular streaks near the suture and with two narrow, interrupted bands, one above the periphery and one below it. Whorls  $4\frac{1}{2}$ , convex, the last not

descending in front, the suture impressed. Aperture subvertical, lunate-circular, peristome simple, narrowly expanded, slightly reflexed at the columellar insertion. Umbilicus funnel-shaped, moderately wide.

*Measurements of type.*—Diameter 20.3 mm., height 10.4 mm., diameter of aperture 9.9 mm., height of aperture 9.8 mm., diameter of umbilicus 3.4 mm.



A



B



C

FIG. 115. *Systrophia (Systrophia) platysma* sp. nov. C.N.H.M. No. 30926, type. A, Front view. B, View from above. C, View from below. All about  $\times 2.6$ .

***Systrophia (Systrophia) platysma* sp. nov.** Figure 115.

*Type.*—Chicago Natural History Museum No. 30926, from Huarango, east side of Río Chinchipe, close to Río Marañon, Peru. Altitude 1,400 meters. Collected by and received from Dr. W. Weyrauch.

*Diagnosis.*—A low, flat species of the typical subgenus of *Systrophia*, characterized by the peripheral flattening of the last whorl about one-fourth of a convolution before the aperture.

*Comparisons.*—In a general way, *S. platysma* resembles *S. calculina* Pfeiffer in flat and low shell and in its wide umbilicus, but *calculina* lacks the flattening of the last whorl characteristic of *platysma*, as well as the slightly thickened and reflexed lip of the latter.

*Description of type.*—Shell low and planorboid, transparent but solid, with the upper side flat, but with the apex slightly raised, yellowish white, shiny, widely umbilicate. Whorls eleven, densely coiled and slowly increasing but for the last, which in front of the aperture widens abruptly to about four times the width of the penultimate; about one-fourth of a convolution distant from the aperture there is a peculiar peripheral flattening of the last whorl that makes the shell look malformed. The suture is distinct. The surface of the shell is smooth. The umbilicus is widely funnel-shaped; its diameter is about one-half of that of the shell. The aperture is half-elliptical with the ends converging, with a slightly thickened and lipped but not reflexed peristome; the upper outer margin appears straight according to the flattening of the last, descending portion of the last whorl.

*Measurements of type.*—Diameter 10.0 mm., height 3.3 mm., diameter of aperture 2.0 mm., height of aperture 2.0 mm., diameter of umbilicus 5.1 mm.

*Paratypes.*—Eleven specimens, No. 30927, with the same data as the type. The diameter varies between 9.3 mm. and 9.9 mm., but otherwise there seems to be little or no variation.

### **Systrophia (Systrophia) impressa** sp. nov. Figure 116.

*Type.*—Chicago Natural History Museum No. 30528. Received with the Walter F. Webb Collection, the only data being "South America."

*Diagnosis.*—A planorboid species of the typical subgenus of *Systrophia*, of medium size, characterized by a very distinct, puncture-like impression on the upper side of the last whorl shortly behind the aperture.

*Comparisons.*—This new species belongs to the group of tightly coiled, planorboid forms within *Systrophia* proper of which *S. affinis* Pilsbry may serve as an example. In fact, the new *S. impressa* resembles *affinis* very much in most features of the shell, but is easily distinguished from it by the very distinct puncture-like impression in the flattened last portion of the last whorl.

*Description of type.*—Shell planorbiform with the spire very slightly sunk, transparent but solid, whitish-brown, smooth, glossy, umbilicate. Whorls  $9\frac{1}{2}$ , densely coiled, slowly increasing in width, the last about twice as wide as the penultimate, broadened toward the aperture and almost imperceptibly descending. Suture distinct. Upper side of whorls little swollen, lateral outline convex, under side

moderately swollen. Umbilicus funnel-shaped, all whorls visible, its diameter a little wider than half the diameter of the shell. Aperture oblique, half-elliptical but irregularly so, since the upper right margin is distorted by the impression on the last whorl, which shows



A

FIG. 116. *Systrophia* (*Systrophia*) *impressa* sp. nov. C.N. H.M. No. 30528, type. A, Front view. B, View from above. C, View from below. All about  $\times 4$ .



B



C

within the aperture as a blunt protrusion; peristome with a narrow lip and reflexed only on the base.

*Measurements of type.*—Diameter 10.9 mm., height 3.8 mm., diameter of aperture 3.3 mm.

*Paratypes.*—Paratype No. 30529, from the same lot as the type, corresponds to the type in every respect; its diameter is 12.0 mm., and its peristome is slightly injured. Paratypes No. 30530 from Bolivia, distributed by the late H. B. Preston and received by Chicago Natural History Museum with the G. K. Gude Collection, are entirely typical, but slightly smaller, their diameter not exceeding 10.3 mm.

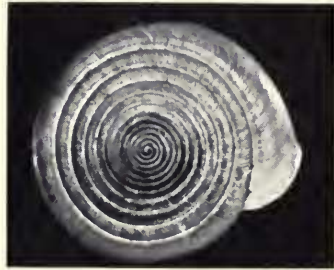
*Discussion.*—Had it not been for the last-named paratypes from Bolivia, I would not have ventured to describe this conchologically well-defined species with no other information about its origin than "South America."

**Systrophia (Systrophia) cereonitens** sp. nov. Figure 117.

*Type.*—Chicago Natural History Museum No. 30924, from south of San Ignacio and west of Río Chinchipe, Peru, close to the



A



B



C

FIG. 117. *Systrophia (Systrophia) cereonitens* sp. nov. C.N.H.M. No. 30924, type. A, Front view. B, View from above. C, View from below. All about  $\times 2.5$ .

border of Ecuador. Altitude 1,200 meters. Collected by and received from Dr. W. Weyrauch.

*Diagnosis.*—A species of the typical subgenus of *Systrophia* characterized by thirteen whorls in a shell whose height equals almost one-half of its diameter.

*Comparisons.*—This novelty can be compared, to a certain degree, with *Systrophia helicycloides* Orbigny, which has about the same general appearance, but from which it differs by its raised—not sunk—spire, the much narrower umbilicus, and by its thirteen whorls, whereas *helicycloides* has at the most ten whorls.

*Description of type.*—Shell flat, with the spire only slightly raised, transparent, rather solid, waxy, of a grayish green color. Whorls thirteen, very slowly increasing except for the last, which widens

suddenly toward the aperture, where it is about four times as wide as the penultimate; it descends very slightly toward its end. The suture is distinct and at places subcrenulated by the radial, densely set striae on the whorls. The lower side of the last whorl is very convex, while the lateral outline is almost straight, passing into the upper side by an obtuse angle and gradually, insensibly, into the lower side. There are no radial striae on the side and the lower part of the last whorl, which are smooth, and which show only some superficial spiral striae around the periphery. The aperture is irregularly crescent-shaped, slightly lipped all around, nowhere reflexed; the upper outer margin is flattened on account of a terminal flattening of the last whorl. The umbilicus is widely funnel-shaped, its diameter a little wider than one-third of the greater diameter of the shell.

*Measurements of type.*—Diameter 14.1 mm., height 6.7 mm., diameter of aperture 3.2 mm., height of aperture 4.5 mm., diameter of umbilicus 5.4 mm.

*Paratypes.*—Paratypes No. 30925, with the same data as the type. In the series of more than twenty specimens there is little variation in the diameter, which may be as little as 13.0 mm.

### **Systrophia (Systrophiella) gyrellina** sp. nov. Figure 118.

*Type.*—Chicago Natural History Museum No. 30532, from Valley of Río Mantaro, Huancamayo, Peru. From the Walter F. Webb Collection.

*Diagnosis.*—A species of the subgenus *Systrophiella* of *Systrophia*, characterized by seven whorls in a shell with diameter only 6.1 mm., being thus much smaller than all the other known species of *Systrophiella*.

*Comparisons.*—Very much like a miniature of *S. tortilis* Morelet, being practically identical with it but for its size. *S. gyrella* Morelet and *S. incarum* Crawford seem to be close relatives also.

*Description of type.*—Shell depressed, thin, umbilicate, diaphanous, very light horn-colored, somewhat shiny, smooth, but microscopically hair-striate. Whorls seven, slowly and regularly increasing in size, the last about twice as wide as the preceding, not descending in front; suture deep, channeled in places. Upper side of the whorls rather flat, side convex and subangulate at the periphery, under side rather swollen. Aperture lunate, plain, without a peristome. Umbilicus less than half of the shell diameter, funnel-shaped.



*Measurements of type.*—Diameter 6.1 mm., height 2.5 mm., diameter of aperture 1.1 mm. The last third of the last whorl of the type was accidentally crushed after the description was drawn up.

*Paratypes.*—No. 30531, with the same data as the type. One specimen, partly broken, has a diameter of 6.4 mm. The other three



A



B



C

FIG. 118. *Systrophia (Systrophiella) gyrelina* sp. nov. C.N.H.M. No. 30532, type. A, Front view. B, View from above. C, View from below. All about  $\times 5$ .

specimens are all quite typical, but are smaller than the type, being not quite adult.

#### *Austroselenites* (?) *weyrauchi* sp. nov. Figure 119.

*Type.*—Chicago Natural History Museum No. 30939, from Cuzco, Peru. Altitude 3,500 meters. Collected by and presented by Dr. W. Weyrauch, in whose honor the new species has been named.

*Diagnosis.*—A very low conical, almost flat species of *Austroselenites*, with a very wide umbilicus, covered with a yellowish brown conchinc layer with indistinct transverse stripes of darker brown.

*Comparisons.*—Among all the *Austroselenites* known, this novelty can only be compared with *A. variegatus* Haas, which shares the general shell characters with it, differing only in being smaller, a trifle higher and more definitely striped with brownish and yellow.

*Description of type.*—Shell thin, translucent, very low conical, with a very wide and rather shallow umbilicus, covered with a lusterless yellowish-brown conchinc layer. Whorls  $5\frac{1}{2}$ , slowly and regularly growing, covered with low radial ribs narrower than the interstices, these ribs more crowded on the earlier whorls and extending to the under side; the color of the interstices is somewhat darker



A

FIG. 119. *Austroselenites* (?) *weyrauchi* sp. nov. C.N.H.M. No. 30939, type. A, Front view. B, View from above. C, View from below. All about  $\times 2.5$ .



B



C

than that of the ribs; suture very deep; upper side of the whorls rather flat, under side very convex, almost cylindrical. Aperture oblique, roundish, somewhat wider than high, peristome straight, not expanded, the margins converging. Umbilicus about two-fifths of the shell in width, shallowly funnel-shaped.

*Measurements of type.*—Width 17.3 mm., height 7.3 mm., width of aperture 5.8 mm., height of aperture 5.0 mm., diameter of umbilicus 7.2 mm.

*Paratypes.*—No. 30940, with the same data as the type. Two specimens not quite fully grown are smaller than the type but conform with it otherwise.

*Discussion.*—Both *A. weyrauchi* and *A. variegatus* stand somewhat isolated among the *Austroselenites* and may well be the representatives of a subgenus of their own; however, on account of the scarcity of the material studied thus far and the entire lack of anatomical information, the erection of a new subgenus seems inadvisable.

**Happia (Happia) cuzcana planior** subsp. nov. Figure 120.

*Type.*—Chicago Natural History Museum No. 30933, from



A

FIG. 120. *Happia (Happia) cuzcana planior* subsp. nov. C.N.H.M. No. 30933, type. A, Front view. B, View from above. C, View from below. All about  $\times 2.5$ .



B



C

Oreja de Capedo, Chanchamayo, Peru. Altitude 1,600 meters. Collected by and received from Dr. W. Weyrauch.

*Diagnosis.*—A race of *Happia (Happia) cuzcana* Philippi characterized by its small size and the entirely flat spire.

*Comparisons.*—The nominate race, *cuzcana* proper, has six whorls and is about 19 mm. in diameter. Our new shell, which resembles the nominate race very closely, is much smaller, the largest specimen, the type, having only five whorls and measuring only 12 mm. in diameter. There is, of course, the possibility that all our specimens are not fully adult and that they might have attained a sixth whorl with further growth, but even then, they are smaller than *cuzcana cuzcana*, which, in the five whorl stage, measures 15 mm. in diameter. Whereas in *cuzcana* proper the spire, though

very low and almost orbicular, is nevertheless slightly raised, that of *cuzcana planior* is definitely flat.

*Description of type.*—Shell orbicular, fragile, transparent, light horn-colored, smooth, widely umbilicate. Whorls five, the four first regularly, the last one rapidly increasing; suture distinct. Lower side almost flat, umbilicus funnel-shaped, its diameter about one-third of that of the shell. Aperture semilunar, decidedly wider than high, margins straight, without lip.

*Measurements of type.*—Diameter 12.0 mm., height 4.2 mm., width of aperture 4.1 mm., height of aperture 3.0 mm.

*Paratypes.*—No. 30934, from the locality of the type, has a diameter of 12.9 mm., but otherwise resembles the type completely. Five paratypes (No. 30936) from Quillabamba, Urubamba Valley, Peru (altitude 1,000 meters), are younger shells, collected dead, and two paratypes (No. 30935) from Andahuaylas (altitude 3,100 meters) are similar. All the paratypes mentioned were collected by and received from Dr. W. Weyrauch.

### **Radiodiscus (Radioconus) microhelix** sp. nov. Figure 121.

*Type.*—Chicago Natural History Museum No. 30921, from the Chanchamayo Valley, Peru. Altitude 800 meters. Collected by and received from Dr. W. Weyrauch.

*Diagnosis.*—A species of the subgenus *Radioconus* of *Radiodiscus*, characterized by its trochiform shell and wide umbilicus.

*Comparisons.*—While very similar to *Radiodiscus bactricolus* Guppy, its closest relative, as far as the sculpture of the shell is concerned, this new species differs basically from it by the more dome-shaped spire and the wider umbilicus. *R. ditzleri* H. B. Baker from Venezuela is also closely related.

*Description of type.*—Shell low trochiform, fragile, transparent, ribbed, widely umbilicate, grayish brown. Whorls  $4\frac{1}{2}$ , regularly growing, increasingly convex, separated by a deep suture; the first  $1\frac{1}{2}$  whorls are very minutely spirally sculptured, the following ones show densely spaced, sharp and elevated, straight ribs, of which there are 42 on the penultimate whorl; the interstices between these ribs show a sculpture of densely set, fine, low striae, parallel among themselves and with the ribs, crossed by still finer spiral lines. Aperture almost circular, little excised, with simple margins whose ends are convergent and united, on the palatal wall, by a distinct though thin callus. Under side of shell very convex; umbilicus wide and funnel-shaped, its diameter about two-fifths of that of the shell.

*Measurements of type.*—Diameter 3.1 mm., height 2.1 mm., diameter of aperture 0.8 mm., height of aperture 0.8 mm., diameter of umbilicus 1.1 mm.

*Paratype.*—No. 30922, with the same data as the type, and identical with it in all details.

FIG. 121. *Radiodiscus (Radioconus) microhelix* sp. nov. C.N.H.M. No. 30921, type. A, Front view. B, View from above. C, View from below. All about  $\times 10$ .



A



B



C

*Remarks.*—This new species seems to be the first Andean representative of the subgenus *Radioconus*, whose remaining species occur only in northeastern South America.

***Euglandina (Euglandina) cylindrus angusta* subsp. nov.**

Figure 122.

*Type.*—Chicago Natural History Museum No. 30911, from Jaën, Peru. Altitude 700 meters. Collected by and received from Dr. W. Weyrauch.

*Diagnosis.*—A subspecies of *E. cylindrus* Martens, characterized by the possession of an additional half whorl of the spire, by greater length and by its very obvious slenderness.

*Comparisons.*—The nominate form from the Colombian Andes has only seven whorls and measures not more than 39 mm., whereas the Peruvian subspecies attains a length of 46 mm. with  $7\frac{1}{2}$  whorls in the spire; with a width of 15.9 mm. it is comparatively much

more slender than *cylindrus cylindrus*, which it otherwise resembles closely.

*Description of type*.—Shell almost turrite, subcylindrical, subsolid, whitish, waxy, densely and lightly ribbed-striate. Whorls  $7\frac{1}{2}$ , little



FIG. 122. *Euglandina (Euglandina) cylindrus angusta* subsp. nov. C.N.H.M. No. 30911, type, front view; about  $\times 2$ .

convex, becoming gradually flatter, separated by a crenulate, distinct, slightly irregular suture; apex very obtuse. Aperture oblong-elliptical, equalling about half of the height of the shell; columella abruptly truncated, vertical, joining the parietal wall in a distinct though wide angle.

*Measurements of type*.—Height 51.0 mm., width 15.9 mm., height of aperture 21.6 mm., width of aperture 6.5 mm.

*Discussion*.—Some time ago I reported a very young specimen of an *Euglandina* as the first record of the genus from Peru (Fieldiana,

Zool., 31: 240, 1949). This could not be specifically determined. In this new *Euglandina* (*Euglandina*) *cylindrus angusta* we have another proof that the genus *Euglandina* is not absent from Peru, though it is apparently rather scarce and perhaps only locally represented.

**Obeliscus (Protobeliscus) nanus** sp. nov. Figure 123.

*Type*.—Chicago Natural History Museum No. 30931, from the Chanchamayo Valley, Peru. Altitude 800 meters. Collected by and received from Dr. W. Weyrauch.



FIG. 123. *Obeliscus* (*Protobeliscus*) *nanus* sp. nov. C.N.H.M. No. 30931, type, front view; about  $\times 6$ .



FIG. 124. *Leptinaria* (*Lamel-laxis*) *eyerdami* sp. nov. C.N.H.M. No. 30844, type, front view; about  $\times 7$ .

*Diagnosis*.—A species of the subgenus *Protobeliscus* of *Obeliscus*, characterized by its small size combined with great slenderness.

*Comparisons*.—None of the other known species of *Protobeliscus* can be regarded as closely related to this new form; all of them, if slender, are much larger, or, if of the same size, as, for example *O. pusillus* H. A. Adams, they are distinctly stouter. Only the Brazilian *O. subuliformis* Moricand, which is a species of *Obeliscus* (*Obeliscus*), is as slender as *nanus*.

*Description of type*.—Shell elongate, turreted, very slender, glossy, smooth, light yellowish gray, imperforate. Whorls ten, the apical ones convex, the remaining ones gradually flatter, densely hair-striate; suture distinct, crenulate. Aperture small, subrhombic-oval,

broadly curved below, pointed above; peristome simple, unexpanded. Columella straight, passing in an obtuse angle into the basal margin.

*Measurements of type*.—Height 7.0 mm., width 1.8 mm., height of aperture 1.2 mm., width of aperture 1.0 mm.

*Paratype*.—No. 30932, with the same data as the type. A specimen collected dead and partly weathered, 8.5 mm. high and with eleven whorls, otherwise identical with the type.

**Leptinaria (Lamellaxis) eyerdami** sp. nov. Figure 124.

*Type*.—Chicago Natural History Museum No. 30844, from Baños, Tunguragua, Ecuador. Collected by Wm. Macintyre and presented by Walter J. Eyerdam of Seattle, Washington.

*Diagnosis*.—A species of the subgenus *Lamellaxis* of *Leptinaria*, characterized by its turrite form with decidedly convex whorls and by the almost regular though very delicate striation.

*Comparisons*.—Among its consubgenera, this new species most resembles *L. paludinoidea* Orbigny from Cuba, but is smaller and more turrite, has more swollen whorls and has the aperture narrower in its upper half, thus resembling the outlines of a pear.

*Description of type*.—Shell turrite, imperforate, creamy-whitish, glossy, almost smooth, but covered with closely spaced, almost regular and very delicate striae. Whorls  $6\frac{1}{2}$ , the earlier ones moderately, the later ones decidedly convex and with an impressed line near and parallel to the deeply cut suture. Aperture small, pear-shaped, slightly oblique; columella rather concave, broadly truncate below.

*Measurements of type*.—Height 6.4 mm., width 2.3 mm., height of aperture 1.6 mm., width of aperture 1.1 mm.

*Paratypes*.—Five paratypes, Chicago Natural History Museum No. 30845, with the same data as the type. No striking variations from the type are discernible.

*Discussion*.—The new *L. eyerdami* is the first species of the otherwise West Indian subgenus *Lamellaxis* reported from the mainland of South America.

**Chilina minuta** sp. nov. Figure 125.

*Type*.—Chicago Natural History Museum No. 30941, from Baños Morales near Santiago, Chile. Collected by Tito Ramirez in February, 1948, and presented by Dr. W. Weyrauch.



*Diagnosis*.—With  $5\frac{1}{2}$  whorls and 11.1 mm. height, this is the smallest of all known species of *Chilina*.

*Comparisons*.—*C. minuta* has little if any resemblance to other Chiliniidae, being so much smaller and decidedly lymnaeiform in shape.

*Description of type*.—Shell elongate-ovate, subsolid, imperforate, with a pointed apex and a high aperture. Whorls  $5\frac{1}{2}$ , rapidly increasing, rather convex, separated by a subcrenulate suture; apex



A



B

FIG. 125. *Chilina minuta* sp. nov. C.N.H.M. No. 30941, type. A, Front view. B, Side view. Both about  $\times 4$ .

smooth, globular, almost at 90 degrees of the axis of the shell, the remaining whorls finely radially striate; conchinc layer rufous, with decurrent zigzag stripes of brownish purple. Aperture higher than the spire, elongate-ovate, pointed above, rounded below, peristome straight, not thickened; columella long, vertical, with a slight, twisted lamella near its upper end.

*Measurements of type*.—Height 11.1 mm., width 5.4 mm., height of aperture 7.9 mm., width of aperture 2.8 mm.

*Paratypes*.—No. 30942 (13) Chicago Natural History Museum, with the same data as the type. No remarkable variations from the conditions in the type can be seen.

***Helicina (Helicina) munda* sp. nov.** Figure 126.

*Type*.—Chicago Natural History Museum No. 30937, from Ayancocha, near Huánuco, Peru. Altitude 2,200 meters. Collected and presented by Dr. W. Weyrauch.

*Diagnosis.*—A species of *Helicina* proper, characterized by the otherwise unfamiliar combination of small size (diam. 6.3 mm.) with rather swollen whorls, the last of which is bluntly carinated, and with a definite, closely set spiral striation on the upper side of the whorls.

*Comparisons.*—None of the Andean species of *Helicina* seem to bear any closer relation to this novelty, which resembles much the



FIG. 126. *Helicina (Helicina) munda* sp. nov. C.N.H.M. No. 30937, type. A, Front view. B, View from below. Both about  $\times 5$ .

*brasiliensis* group from Brazil, especially *brasiliensis* Gray with its subspecies, and *densestriata* J. A. Wagner, all of which are, however, larger than *H. munda*.

*Description of type.*—Shell depressedly conical with convex base, thin, transparent, somewhat shining, yellowish on the earlier whorls, light brown on the last. Whorls  $4\frac{1}{2}$ , regularly increasing, apex prominent though globular, suture shallow but definite. All the whorls, save the apical one, are covered on their upper side by clear cut though not deep spiral incisions that become obsolete beyond the bluntly carinated periphery. Under side of shell somewhat more convex than upper side. Aperture rounded triangular, peristome not thickened, reflexed only very little and only below and at the columella; columella thin, vertical and passing over into the basal margin in a rounded angle; basal callus narrow, bordered by a shallow furrow. Operculum unknown.

*Measurements of type.*—Height 4.0 mm., width 6.3 mm., height of aperture 3.2 mm., width of aperture 2.5 mm.

*Paratypes.*—The two paratypes under Chicago Natural History Museum No. 30938, with the same data as the type, correspond completely with it.

## REFERENCES

- ALBERS, J. CHR.  
1854. Novorum heliceorum diagnoses. Malak. Blätter, 1: 213-221.
- ALDERSON, E. G.  
1925. Studies in *Ampullaria*. pp. 1-102, pls. 1-19. W. Heffer and Sons, Cambridge, Engl.
- CRAWFORD, G. I.  
1939. Report on the terrestrial Mollusca collected by the Percy Sladen Expedition to Lake Titicaca, 1937. Proc. Mal. Soc. London, 23: 318-332, figs. 28-30, pls. 19-20.
- HENDERSON, J. B. and BARTSCH, P.  
1920. A classification of the American operculate land mollusks of the family Annulariidae. Proc. U. S. Nat. Mus., 58: 49-82.
- HOLMBERG, E. L.  
1909. Mollusca Argentina varia. Apuntes Hist. Nat., 1: 91-92.
- KOBELT, W.  
1911-15. Die Gattung *Ampullaria*. Neue Folge. In Abbildungen nach der Natur mit Beschreibungen. Martini-Chemnitz, Conch. Cab., I, 20: 236 pp., pls. 22-79.
- PAIN, T.  
1946. Two new species of *Pila* (= *Ampullaria*) from South America. Proc. Mal. Soc. London, 26: 180-181, pl. 6.
- PILSBRY, HENRY AUGUSTUS  
1907. Manual of Conchology. Second series, 18: Achatinidae: Stenogyrynae and Coeliacinae. 357 pp., 51 pls.
- PILSBRY, HENRY AUGUSTUS and OLSSON, AXEL A.  
1949. The landsnail genus *Xenothauma* and other carinate Bulimulidae of Peru. Not. Nat., No. 215, 14 pp., 19 figs.
- PRESTON, H. B.  
1907. Descriptions of new land and freshwater shells from Central and South America. Ann. Mag. Nat. Hist., (7), 20: 490-498, 20 figs.
- TAYLOR, JOHN W.  
1902-1907. Monograph of the land and freshwater Mollusca of the British Isles. 2, Testacellidae, Limacidae, Arionidae. 312 pp., 275 figs., 25 pls.
- THIELE, J.  
1929-31. Handbuch der systematischen Weichtierkunde. 1, 778 pp., 782 figs.



